

Docket No.: 3884-0124PUS1
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Seung-Hyun KIM

Application No.: 10/532,713

Confirmation No.: 8958

Filed: April 27, 2005

Art Unit: 3644

For: A PELLET OF BULBOUS PLANTS, A
METHOD OF PELLETIZATION AND A
CULTIVATION METHOD OF PLANTS
USING THE SAME

Examiner: Palo, Francis T.

DECLARATION UNDER 37 C.F.R. §1.132

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

1. Dr. Seung-Hyun KIM, hereby declare as follows:

2. I am a professor in the department of Landscape Architecture, Sang Yong College. I received my Bachelor of Science degree in Industrial Department of Agronomy at Korea National Open University in 1986, and my Masters degree in Department of Horticulture at Jeju National University in 1988, and my Doctors degree in Department of Horticulture at Jeju National University in 1995. A full and accurate account of my qualifications including education, publication, and titles, for example, is presented in my curriculum vitae (C.V.) as an

appendix attached hereto;

3. I have reviewed the prosecution history of U.S. application no. 10/532,713. I am particularly familiar with the rejections of claims 1 and 6-8 over U.S. Patent No. 4,628,633 (Nilsson) in view of U.S. Patent No. 3,883,989 (Melvoid), U.S. Patent No. 4,551,165 (Warner) and U.S. Patent No. 2,757,841 (Chapman)

4. In order to show that the present invention is distinct from and patentable over the cited references, the following experiments are provided and the significance thereof is discussed below.

5. Experiment I

(1) Object

Pellets are not subsidiary implements for storing bulbous plants, but rather ones for magnifying the size of bulbs. The greater the size of the bulb, the greater the growth of the bulb. This is directly proportional to greater size in every aspect (harvesting, blooming, the weight and size of plants, etc.). According to this fact, the present invention is directed to manufacturing of small sized bulbs into pellets in order to achieve the same effect as that for much larger sized bulbs.

(2) Pelletization of tuberous plants

① The present invention as recited in claim 1 includes:

a) mixing (1) fertilizer comprising nitrogen (N), phosphorous (P) and potassium (K), (2) plant growth hormone comprising gibberellic acid (GA), (3) peat moss, and (4) water soluble glue to obtain a pellet mixture;

b) compressing and forming a pellet from said pellet mixture prepared in Step a) by dividing the pellet mixture into a lid and a base;

c) drying the pellet formed in Step b) to achieve a water content of 15-25% by weight;

d) inserting the tuberous plants in the dried base, covering the dried base having the inserted tuberous plants with the dried lid and compressing to produce a pellet with the inserted tuberous plants; and

e) sowing the pellet obtained in Step d) without covering with soil.

② U.S. Patent No. 4,628,633 (Nilsson)

Nilsson is directed to a seed capsule comprising a substantially spherical body formed in one piece by compression of peat; and having a radial recess extending substantially from the center thereof, a plug member sealing the peripheral end of said recess, said recess and said sealing member defining a seed room, and a seed located in said substantially spherical body comprising a peripheral portion of hexagonal configuration substantially coaxial to said radial recess.

(3) Magnification assay for evaluating the growth of bulb size depending on the absence or presence of a fertilizer and a growth hormone

The following experiment was carried out from September 2007 to November 2007. The

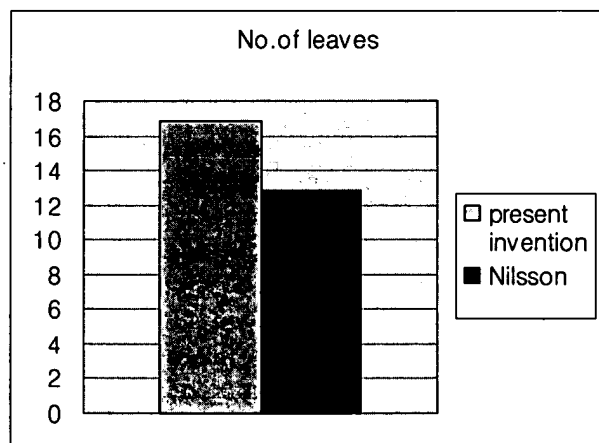
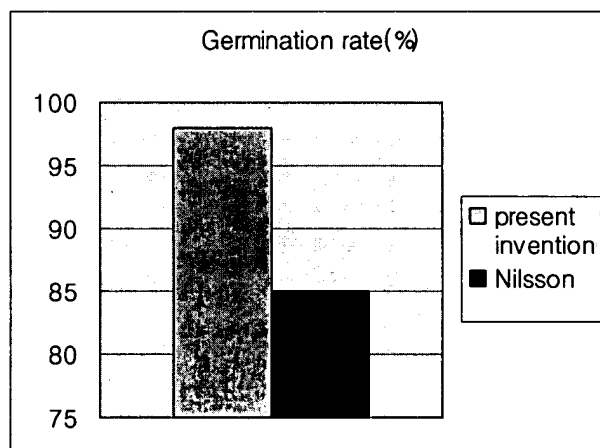
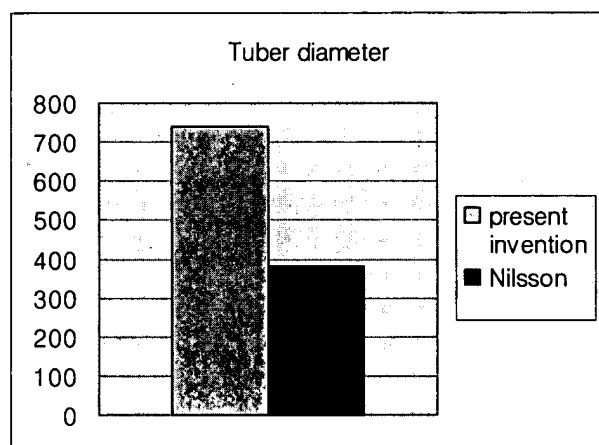
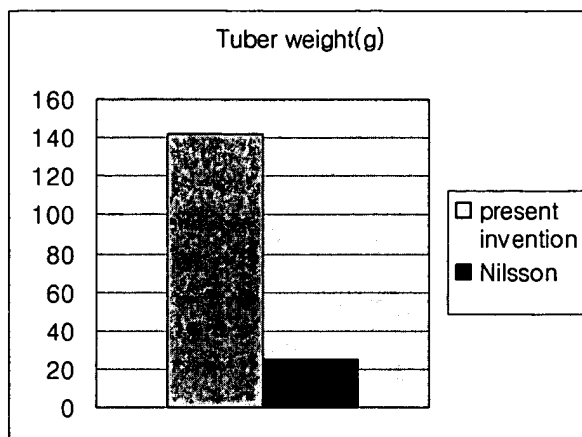
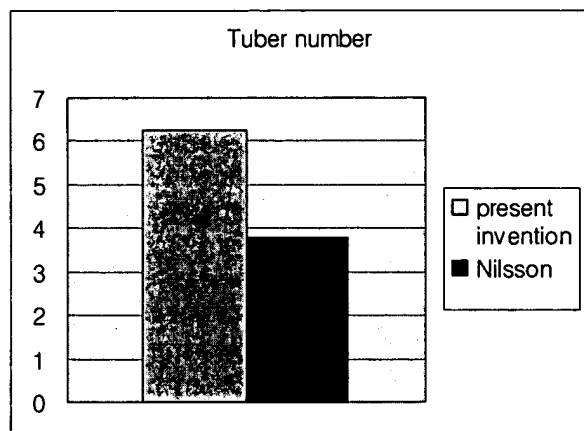
planting was conducted in an aluminum foil bowl filled with peat and in which the top layer was mixed with sand. The aluminum foil bowl was placed in an outer bowl having half a centimeter to one centimeter of water in the bottom thereof. Through holes in the aluminum foil bowl the germination substrate was continuously kept moist. The temperature was kept at $24 \pm 1^\circ \text{C}$ and light was provided for 14 hrs/each day, and darkness was maintained for 10 hrs/each day. This process was carried out three times repeatedly for one hundred potatoes. The following Table 1 presents a comparison of pellets between the present invention and Nilsson in terms of essential components. Also, Table 2 and five graphs show the growth results therefrom.

【Table 1】

Example	Fertilizer	Growth hormone	Peat moss	Planting method
The present invention	N:300, P:200, K:400 (mg/L)	Gibberellic acid (GA)	Peat moss	Planting seed in the soil surface
Nilsson	-	-	Peat moss	Planting seed in the soil surface

【Table 2】

Example	Tuber number	Tuber weight (g)	Tuber diameter (mm)	Germination rate (%)	No. of leaves
The present invention	6.26	141.51	740	98	16.82
Nilsson	3.80	62	380	85	12.8



Due to the combined fertilizer and growth hormone, the bulb size of the present invention was increased, resulting in striking distinctions compared to that of Nilsson in terms of tuber number, tuber weight, tuber diameter, germination rate and number of leaves. This is shown in Table 2 and the prior five graphs.

Especially, the present invention shows a synergistic effect on the rate of growth and germination depending on the size of bulbs. In other words, it is evident that the size of bulbs increases by cooperation of the fertilizer (N, P and K) and growth hormone.

6. Experiment II

(1) Object

At the time of manufacturing pellets, bulbs should not be inserted into pellets until the pellets become dry. In the case that the moisture content of the pellet is outside of the range of 15~25%, the peat moss cannot be compressed or the moisture contained in materials is absorbed into bulbs. The result of such a situation is that the nutrients in store become active. Therefore, the moisture content has a substantial impact on the increase of the bulb size, the germination possibility and the growth rate.

(2) Pelletization using different water contents

The experiments include:

a) mixing (1) fertilizer comprising nitrogen (N), phosphorous (P) and potassium (K), (2) plant growth hormone comprising gibberellic acid (GA), (3) peat moss, and (4) water soluble glue to obtain a pellet mixture;

b) compressing and forming a pellet from said pellet mixture prepared in Step a) by dividing the pellet mixture into a lid and a base;

c) drying the pellet formed in Step b) to achieve a water contents of below 5% (Example I), 5-15% (Example II), 15-25% (Example III), 25-35% (Example IV), 35-45% (Example V) by weight;

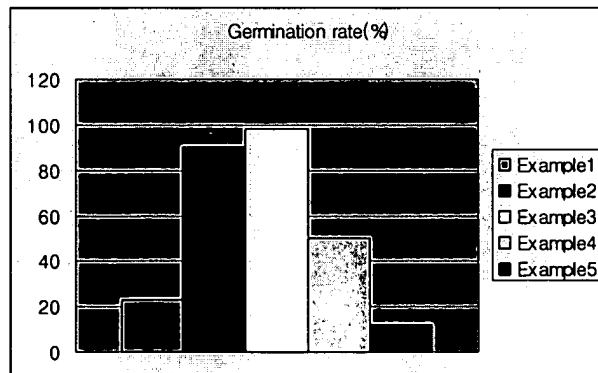
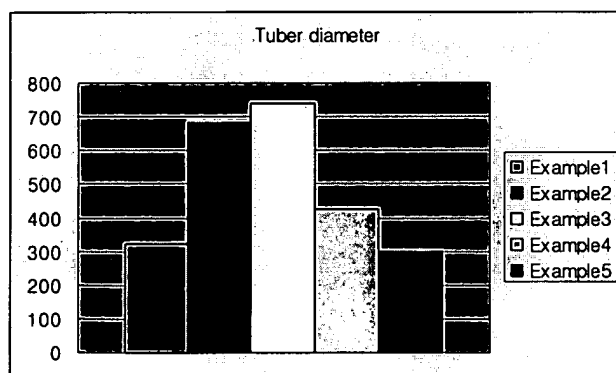
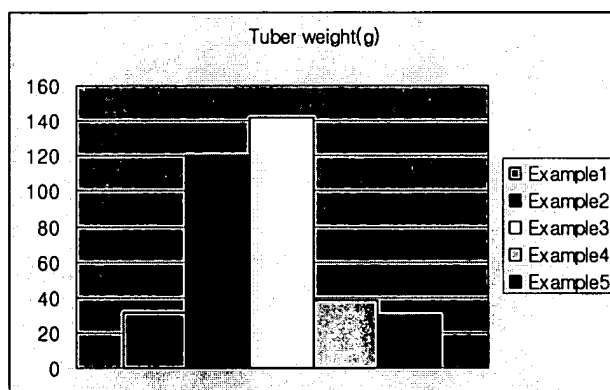
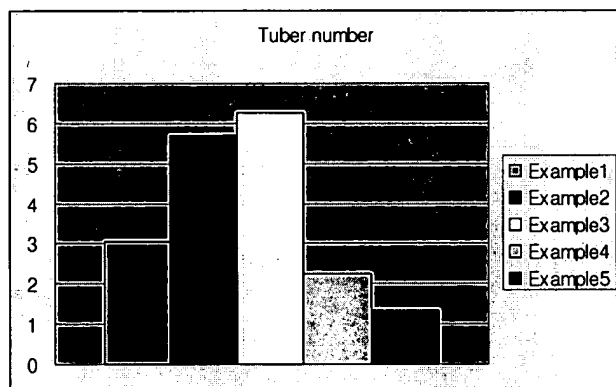
d) inserting the tuberous plants in the dried base, covering the dried base having the inserted tuberous plants with the dried lid and compressing to produce a pellet with inserted tuberous plants.

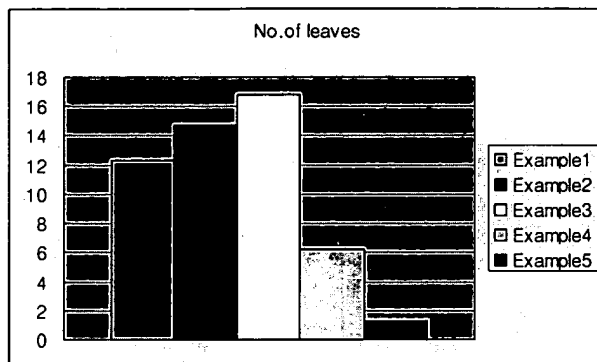
(3) Magnification assay for evaluating an impact of different water content ranges on the size of bulbs

This experiment was carried out from September 2007 to November 2007. The planting was conducted in an aluminum foil bowl filled with peat and in which the top layer was mixed with sand. The aluminum foil bowl was placed in an outer bowl having half a centimeter to one centimeter of water in the bottom thereof. Through holes in the aluminum foil bowl the germination substrate was continuously kept moist. The temperature was kept at $24 \pm 1^{\circ}\text{C}$ and light was provided for 14 hrs/each day, and, darkness was maintained for 10 hrs/each day. The process was carried out three times repeatedly for one hundred potatoes. The following Table 3 and 5 graphs show the results depending on the water content range.

【Table 3】

Example	Tuber number	Tuber weight (g)	Tuber diameter (mm)	Germination rate (%)	No. of leaves
Example I	3.06	31.32	320	23	12.31
Example II	5.70	120	683	90	14.70
Example III	6.26	141.51	740	98	16.82
Example IV	2.25	38.37	425	50	6.24
Example V	1.33	30.02	300	12	1.33





As disclosed in “(1) Object” section of Experiment II, when the moisture content of the pellet is outside of the range of 15~25%, the peat moss cannot be compressed or the moisture contained in materials is absorbed into bulbs. The result of such a situation is that the nutrients in store become active. Therefore, from the above experiment, it can be seen that the moisture content has a substantial impact on the size of bulbs, germination possibility and growth rate.

Melvoid is directed to plate shapes of peat moss, and it is impossible to mechanize planting. Also, Melvoid discloses a moisture content range, however, this range of 10~25% of Melvoid relates to the compressed peat moss without seeds. In other words, the seeds are planted after peat moss is expanded by the absorption of moisture. In contrast, the moisture content range of 15-25% of the present invention relates to a compressed peat moss within bulbs. Therefore, the claimed invention is patentably distinct from the combination of Nilsson with Melvoid.

Nilsson does not relate to capsule bulbs. Instead, Nilsson pertains to a capsule for seeding. In addition, Nilsson’s manufacturing process has no drying process, and thus the seeds absorb the moisture inside the capsule. Therefore, the bud comes out inside the capsule. This decreases the germination possibility and, as a result, the cultivation method of Nilsson cannot work properly.

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(4) Growth hormone

Warner fails to disclose the test data and the test examples for plant growth assistant in detail, instead merely mentioned them. Warner relates to a pellerization of seeds to inoculate with mycorrhizal. Warner does not specify growth hormone as the assistant,

The undersigned declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S. Code 1001 and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

By: 

Seung-Hyun Kim

Date: Dec. 24. 2007

Appendix: CURRICULUM VITAE

APPENDIX

CURRICULUM VITAE

PERSONAL INFORMATION

Name: Seung-Hyun Kim

Date of birth: November, 11, 1957

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EDUCATION AND PROFESSIONAL TRAINING

Bachelor of Science degree in Industrial Department of Agronomy at Korea National Open University in 1986.

Masters degree in Department of Horticulture at Jeju National University in 1988.

Doctors degree in Department of Horticulture at Jeju National University in 1995

PROFESSIONAL EXPERIENCE

Professional Experience

Professor in the department of Landscape Architecture, Sang Yong College (March. 1991-now)

Exchange Professor at North Carolina States University (September.1997 - June.1998)

Exchange Researcher at Maryland State University (September.1989-August.1990)

Public officer in Dept. Forestry at Jeju Province (June.1983-April.1986)

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Patents or Patent applications

CN Patent No. ZL03 8 25397.6

Korea Patent No. KR10-2004-0457856

Korea Patent No. KR10-2006-0647255

US Application No. US10/532642

JP Application No. JP2004-546521

EP Application No. EP03.809.470.2

EP Application No. EP03.809.471.0